Determinants of government size: Evidence from China

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Abstract: This paper investigates the determinants of government size at the provincial level in China. We employ the panel data model as a platform for empirical analysis and control for endogeneity in the study. Our study shows that openness to trade and foreign direct investment (FDI) may curtail government expansion, and that the provincial-level public sector is characterized by economies of scale. This study also documents that Wagner's law does not hold true for China. Moreover, both expenditure decentralization and revenue decentralization contribute to the expansion of China's government.

Keywords: Government size - Wagner's law - Scale effects - Openness to trade - Fiscal decentralization

JEL Classification: H11 - H61

1 Introduction

The determinants of government size have been an important research area in the literature of economics and political science. After World War II, the size of the public sector expanded in most countries (Cooke 2003; Mueller 2003). Since the 1980s, in the name of new public administration and reinventing government, many countries have attempted to constrain governmental growth even to reduce its size.

Since the 1980s, China has also made great efforts to control government expansion. In 1982, Deng Xiaoping (1984: 374), the Chinese supreme leader, stressed that "streamlining organizations is a matter of great importance. In fact, it constitutes a revolution." Since then, there have been six nationwide downsizing campaigns.

These downsizing movements achieved little success. In some cases, when central government positions were eliminated, officials made redundant by the eliminations were transferred to new positions in publicly funded service units, such as schools. Thus, in terms of decreasing the number of public employees, downsizing movements fell short of reaching their goal. Yang (2004: 53) also points out that, in terms of reducing government payroll spending, "the reforms have yielded few dividends so far."

Aggregate data also document an increase in government size. The heaviest cut in public employment was implemented in 1998. Official accounts indicate a decrease of 1.15 million government administrative positions from 1998 to 2002. The number of public officials was reduced by 20% for central- and provincial-level party organizations, 47.5% for the State Council, 48.2% for provincial governments and prefectures, and 19.4% for counties and townships (Burns 2003). Nevertheless, the number of budgeted employees (civil servants plus employees, such as teachers, in public service units) actually kept increasing.[1] As illustrated

[1] Local Fiscal Statistical Materials (*difang caizheng tongjiziliao*) compiled by the Budget Bureau or Treasury Bureau of the Ministry of Finance provide detailed information on the numbers of budgeted employees at the subnational level.

in Figure 1, the ratio of local public employees to the total population expanded substantially during the period of 1998–2006.

[Insert Fig.1 here]

Government size, measured by government expenditure as a share of GDP, has also shown an upward trend in recent years. It was 12.79% of GDP in 1998, 17.24% in 2001 and 18.52% in 2005 (see Figure 2). By 2007, government spending was close to 20% of GDP.

[Insert Fig.2 here]

The main reasons for the expansion of China's government, as suggested in the literature, include "maintaining political patronage" (Burns 2003), "party control" (Brødsgaard 2002), the "authoritarian nature of China's political system" (Ngok and Zhu 2007) and "unsuccessful government function shifts" (Ni and An 2008). While this literature may have identified some causes of government growth in China, emphasizing solely the unique characteristics of the Chinese political system may overlook some important factors that also play roles in determining government size. Moreover, to the best of our knowledge, empirical studies on government size using Chinese data are still rare.

This paper attempts to fill the gap in literature by providing a careful empirical investigation of the determinants of government size in China. While controlling for the special characteristics of China and examining the factors that are commonly mentioned in literature (for instance, Wagner's law), we believe that the test results should not only be relevant to those who are interested in China's case but also relevant for improving our understanding of government growth.

Our study provides some potentially intriguing findings that are rarely documented in literature. The results show that openness to trade and foreign direct investment (FDI) may curtail government expansion. In addition, large population size tends to drive down

government size, suggesting that scale economies at the provincial level apply in China's case.

By employing a longitudinal dataset at China's provincial level from 1998 to 2006, our study investigates the determinants of local government size by utilizing both cross-sectional variations and volatility over time. The cross-sectional variations in the data make it possible to examine the role of local heterogeneity (such as, for instance, economy growth, minority population density and local public budget deficits) in the process of local government expansion. The volatility over time helps us to handle the endogeneity issue, which will be explained in detail in a later section.

The rest of the paper is organized as follows: Section 2 provides a brief summary of the literature on the determinants of government size in China. Section 3 discusses the data, definition of variables, model specifications and econometric issues. Empirical results obtained are reported in Section 4. Section 5 presents discussion based on our empirical findings. The final section offers conclusions and policy implications.

2 Variables explaining government size and theoretical arguments

Based on the existing literature, this section summarizes factors that play roles in determining government size generally, while also outlining factors that may be unique in China's case. These factors include (1) economic development, (2) economies of scale, (3) openness to trade and FDI, (4) fiscal decentralization, (5) minority population density and (6) demand for public services.

Economic development. Wagner (1893) introduced the idea that there is a positive relationship between economic development and expansion of the public sector. Economic development leads to a simultaneous increase in government size since people will demand more and better public services when society becomes more affluent (Tobin 2005; Zhu and

Krug 2005). Empirical evidence for this argument is mixed. Akitoby et al. (2006) argue that, though there is strong evidence from industrialized countries, Wagner's law does not hold true in developing countries like China. Recent studies also cast doubt on the existence of Wagner's law (Halicioglu 2003; Lin and Song, 2002; Iyare and Lorde, 2004; Ram 1987; Sinha 2007; Zhang 2007, 2008a, b; Ziramba 2008). The existing studies usually fail to address the endogeneity issue when they test the validity of Wagner's law. The causal relationship between government size and economic development may be opposite of that proposed by Wagner's law; large government size may lead to local economic growth. Research that fails to handle this issue will provide misleading results. In our study, we deal with this reverse causality problem and provide new evidence from China.

Scale effects. Scale effects (total population divided by the number of counties in a province) may apply to government expansion. Since large fixed costs are incurred in setting up an administrative system, a locality with a small population may experience higher public consumption on a per capita basis. Multinational evidence shows that public expenditure as a percentage of GDP tends to be greater in smaller countries (Alesina and Wacziarg 1998), while some empirical studies of individual countries reveal a different pattern and show that scale effects help in explaining government growth (Andrews and Boyne 2009). Since the major component of China's public service (such as basic education and health) is relatively homogeneous, we propose a negative relationship between local population density and government size.

Openness to trade and FDI. The relationship between openness and government size is an intriguing issue for China which, since adoption of the 'open door policy,' is greatly involved in multilateral trade and FDI. It is assumed that a country with greater exposure to international trade is more vulnerable to international economic shocks. Public consumption provides protection to the domestic economy when outside economic shocks occur.

Consequently, government spending serves to reduce risk in an open economy, and openness to trade is positively related to government size (Kimakova 2009; Rodrik 1998). Ferris, Park and Winer (2008), however, document that openness to trade contributes to reducing government size in Canada. Empirical studies examining the relationship between FDI and government size are rare.

In this paper, we propose that both openness to trade and FDI may push the government to perform better and strengthen civil service governance. As long as economic development continues to be the utmost concern in China, local government has a strong incentive to promote a lean and clean mode of operation to attract foreign investors. Openness to trade and FDI also may enhance the learning capacities of local government. The demand for efficient public service from foreign firms may push local government to improve its allocative efficiency. Malesky (2004) documents that FDI improves governance in Vietnam at the provincial level. Cole et al. (2009) also show that foreign investors are more likely to place their investment in Chinese provinces with good governance. Consequently, we propose that openness to trade and FDI inflows reduces bureaucratic expansion.

Fiscal decentralization. Discussing the Leviathan hypothesis, Brennan and Buchanan (1980: 185) point out that "total government intrusion into economy should be smaller, *ceteris paribus*, the greater the extent to which taxes and expenditures are decentralized." Nevertheless, empirical studies on the Leviathan hypothesis present a mixed picture (Marlow 1988; Oates 1985). Since it is not clear whether the impact of decentralization on government size varies when the forms of decentralization differ, Brennan and Buchanan's (1980) collusion hypothesis was put forward as an alternative to the Leviathan hypothesis. The collusion hypothesis proposes that, if the central government collects all taxes and then redistributes some of that revenue to local governments, the effect of decentralization in

reducing government expansion may be reduced.[2] Brennan and Buchanan (1980: 183) note that "revenue sharing is undesirable, because it subverts the primary purpose of federalism, which is to create competition between jurisdictions." Empirical evidence indicates that the collusion hypothesis holds true in many countries (Chen 2004; Ehdaie 1994; Grossman 1989; Stein 1998; Zhu and Krug 2005).

We have a similar hypothesis; fiscal decentralization may reduce government expansion at the local or provincial level when higher authorities do not grant local governments substantial fiscal transfers. Otherwise, even though expenditure decentralization is present, central fiscal subsidies may invite fiscal profligacy and bureaucratic expansion at the local or provincial level.

Minority density. We hypothesize that minority density—the proportion of minority populations in the total population of a province—tends to increase public expenditure in GDP since civil unrest in ethnic minority areas is depicted as one of the major threats to China's social stability (Wang 2002). Localities with more ethnic minorities receive more central grants to moderate potential social instability (Wang 2002), and may spend more for public security.

Demand for public services. The relative size of the non-working population (compared to the working population) may increase the level of public expenditure. Martin (1982) finds a positive correlation between public expenditures and the population shares of students and the elderly. Students demand education services while the elderly require more health care. Thus, we hypothesize that governments will be larger in places when non-workers comprise greater percentages of the population. The unemployed may request that local government

[2] Lalvani (2002: 27–28) notes that the collusion hypothesis has two implications that merit further investigation. They are "(1) total government size will, ceteris paribus, increase with the level of collusion, and (2) the size of each level of government will, ceteris paribus, increase as collusion increases because no component of government will remain a member of the cartel if it does not benefit from it." Zhu and Krug (2005: 8) argue that "The more the intergovernmental grants, the larger the total government size is."

spend more on unemployment compensation and job training. Cusack, Notermans and Rein (1989) and Esping-Andersen (1996) provide evidence supporting the positive relationship between the unemployment rate and government size. In this study, we hypothesize that higher unemployment will be associated with larger government expenditures.[3]

3 Data and methodology

3.1 Definition of variables[4]

3.1.1 Dependent variable

This paper employs a provincial level panel dataset to investigate the determinants of government size in China. The dependent variable, government size (*GSIZE*), is measured by the ratio of local budgetary expenditure to the GDP of each province. This measurement has been commonly employed in multinational studies on government size (Alesina and Wacziarg 1998; Jin and Zou 2002; Ram 2009; Rodrik 1998). Chen (2004) and Zhu and Krug (2005) also use the same measurement to examine government size in China. Government expenditure reflects the public sector's involvement in society; its share of total GDP serves as a proxy representing the scale of governmental activities relative to those of the private sector. (For a detailed discussion of this issue, see Congleton 2001; De Witte and Moesen 2010). This measure is not immune to criticism (Hood 1995). Nevertheless, because the Chinese government tends to under-report public sector employment, and since data for other proxies are not available, the share of local budgetary expenditure in GDP is employed by this study.

[3] China has wrestled with a social "safety net" for the elderly and the unemployed under the schemes of pension and unemployment insurance, respectively, despite the fact that the "safety net" is still fragmented and urban-biased.

[4] Appendix 1 provides a summary of the definition of all variables. Appendix 2 presents descriptive statistics for all variables listed in this section.

3.1.2 Independent variables

1) Economic development (*RGDP_PC*) is measured by provincial real GDP per capita. This variable is adopted for testing the validity of Wagner's law in China.

2) Scale effects are measured by total population divided by the number of counties in a province (*CP*).

3) Openness is measured by two proxies. Openness to trade (*IMPEXP_PC*) is calculated as the total amount of trade (imports plus exports) per capita in a province. Foreign direct investment (*FDI_STOCK*) is measured as the accumulated FDI stock per capita.

4) Fiscal decentralization is measured by three indicators: expenditure decentralization (*SONE*), revenue decentralization (*SONR*), and vertical imbalance (*VER_IMB*). Following Marlow (1988) and Jin and Zou (2002), we employ the ratio of provincial budgetary expenditure to total budgetary expenditure as the measure of expenditure decentralization. The ratio of local revenue to total government revenue evaluates the degree of revenue decentralization as proposed by Jin and Zou (2002). In literature, there are several ways of defining vertical imbalance. Jin and Zou (2002) employ the share of central transfers in subnational expenditure, and Rodden (2002) proposes the share of central transfers in total subnational revenue as a proxy for vertical imbalance. In this paper, we adopt the method suggested by Jin and Zou (2002); thus, vertical imbalance is measured by the ratio of central transfers to subnational expenditure.

5) Minority density (*MC_PERC*) is measured by the share of autonomous counties (with mainly ethnic minority population) in the total number of counties in a province. Observations on the populations of ethnic minorities are available in the *China Statistical Yearbook* only after 2005; thus, we use the share of autonomous counties as a proxy for ethnic minority density.

The demand for public service is measured by the gross dependency ratio (*GDR*), the ratio of non-working population to working population aged 15 to 64 and the unemployment rate. The information about unemployment rate reported in *China Statistical Yearbooks* is for urban areas only. This variable, denoted as *UNEP_URBAN*, serves as our proxy for provincial unemployment rates.

3.2 Data, model specifications and econometric issues

3.2.1 Data source

This empirical study employs a provincial-level panel dataset from mainland China, which covers 30 provinces, for the period 1998–2006. Data before 1998 are not available. We also exclude Tibet since most data for that province are not reported. Data are collected from various issues of the *China Statistical Yearbook* and the *Finance Yearbook of China*. FDI stock rather than FDI flow is employed as proxy for openness to trade; the former is a more reliable variable in that it measures the long-term commitments of foreign firms to China. In view of problems such as 'hot money' and 'capital flight', FDI flow may not serve as a good proxy for our purpose.

3.2.2 Model specifications and econometric issues

In line with former studies, our work uses the standard static panel data model. Estimation results obtained using fixed-effects and random-effects models are compared with findings documented in the existing literature. The econometric literature argues that, when the endogeneity assumption holds, adopting the static panel random-effects model will yield consistent and efficient results. The static panel fixed-effects model, in a broader sense, will always provide consistent results; nevertheless, the panel fixed-effects estimator tends to be less efficient in finite samples and has problems with incidental parameters. The Hausman

test commonly is employed in the existing studies to examine whether there exists any correlation between the individual effects and the regressors. If these two terms are not correlated, the random-effects estimator is preferred; otherwise, the fixed-effects estimator should be employed.

When the Hausman test results suggest a correlation between individual specific effects and the regressors, we should also address the endogeneity problem. Many of the variables in our model, such as economic development and measures of openness, are all potentially endogenous, which may create reverse causal effects on government size. Since we are interested in the one-way causal effect of these factors on government size, we address the endogeneity issue in our study. We adopt the Generalized Method of Moments (GMM) approach to handle the reverse causality problem (Hsiao 2002). More specifically, we use lag one to lag three regressors as instruments in the regression. To verify the validity of these moment conditions, we report Hansen *J* statistics in the empirical results.

The static two-factor panel data model adopted in our empirical study is stated as follows

$$y_{it} = \beta' x_{it} + \lambda_i + \eta_t + u_{it},$$

$$i = 1, \ldots, N;\ t = 1, \ldots, T,$$

where λ_i and η_t denote individual-specific and time-specific effects, respectively.

When the GMM estimator is employed, following Hsiao and Tahmiscioglu (2008), we first eliminate individual-specific effects by taking the first differences of the regression function and then subtract the first difference of the mean of each series in the model across individuals to eliminate the time-specific effects. More specifically, for the dependent variable, we compute:

$$\Delta y_{it} - \Delta y_t,$$

where

$$\Delta y_{it} = (\log Y_{it} - \log Y_{i,t-1}); \quad \Delta y_t = (\frac{1}{N}\sum_{i=1}^{n} \Delta y_{it});$$

$$i = 1, \ldots, N; \; t = 1, \ldots, T,$$

The same transformation is applied to all explanatory variables. The GMM approach will then start with the final transformed model stated below:

$$(\Delta y_{it} - \Delta y_t) = \beta'(\Delta x_{it} - \Delta x_t) + \Delta u_{it},$$

$$i = 1, \ldots, N; \; t = 1, \ldots, T.$$

We calculate the partial correlation coefficients between all repressors, which indicate that expenditure decentralization (*SONE*), revenue decentralization (*SONR*) and vertical imbalance (*VER_IMB*) are highly correlated. Proxies for openness to trade (*IMPEXP_PC*) and FDI stocks (*FDI_STOCK*) are also highly correlated. To control for multicolinearity problems, we enter each variable separately in the regression.

4 Empirical results

[Table 1 to Table 3 about here]

The Hausman test statistics presented in Tables 1 and 2 suggest that the individual specific effects are correlated with the regressors. Consequently, the fixed-effects model is preferred. When factors like FDI stocks (*FDI_STOCK*), expenditure decentralization (*SONE*) and revenue decentralization (*SONR*) are all excluded from the model, as is presented in the last column of Table 1, the Hausman test statistics suggest that we do not have an endogeneity problem. Thus, we can conclude that 'reverse causality' may come from these three factors.

Table 3 presents empirical results obtained by using the two-step GMM estimator. We enter lags one to three of the regressors as instruments to deal with the endogeneity problem. Hansen test statistics indicate that the instruments we adopted are all valid. Notice that adopting the GMM approach can also produce efficiency gains, which can be observed by

comparing the corresponding standard errors of the same model specifications in different tables. Most standard errors obtained by using the GMM approach are smaller than those produced by fixed-effects or random-effects estimators. Consequently, we adopt the empirical results of GMM estimates for reference.

Our empirical results yield the following findings: (1) Wagner's law may not hold true in the case of China. The estimated coefficients for real GDP per capita are negative when they are significant. (2) The 'economies of scale' hypothesis holds true in the case of China. There is a significant negative correlation between population per country and government size. (3) Both openness to trade and FDI have negative and significant effects on government size, suggesting that openness to trade and FDI may help to improve allocative efficiency for government services. (4) Both expenditure decentralization and revenue decentralization have significant positive effects on government size, while the estimated coefficients for vertical imbalance are not significant. (5) There is no evidence supporting the conjecture that minority population density, the gross dependency ratio or the unemployment rate has positive effects on government size.

5 Discussion

Some scholars attribute expansions in the size of government in China, notwithstanding occasional downsizing initiatives, to significant events or periods in its unique history, for example, the adoption of a Leninist party-state and a planned economy in the late 1940s (Burns 2001: 420). It is true that the size of China's government has been influenced by the nation's unique characteristics. Nevertheless, if we over-emphasize these factors unique to China, they may narrow our view with respect to identifying the problems of bureaucratic expansion in the country. The strategy adopted by this study is to provide a rigorous

empirical study on government size in China and to decipher the implications of the Chinese experience for other countries, especially developing countries.

Consistent with some studies of developing countries, the regression results reveal that Wagner's law does not hold true in China. The Research Institution for Fiscal Science of the Ministry of Finance (2002) reports that the poorer the locality, the faster the government grows and the larger the number of budgeted employees. Similar findings are also obtained by Ji et al. (2004). The inapplicability of Wagner's law to China roughly reflects the fact that poor localities may tend to spend more public money to prop up local employment and economic growth. As noted by Akitoby et al. (2006), Wagner's law receives less support in developing countries. Martinez-Vazquez and Yao (2009) argue that Wagner's law has more explanatory power in multi-country- than in single-country analyses since, in some countries, distinct from the private sector, the public sector is subject to political pressures, such as rent-seeking (wherein individuals bribe public officials to obtain posts in the public sector). Some research further shows that bureaucratic expansion serves to promote rent-creation (bribery) and political patronage (Gelb, Knight and Sabot 1991). The implications of our finding that poorer localities tend to have larger governments may be more nuanced. Rent-seeking and nepotism are more prevalent in poor localities in China. Based on field research, Liu and Tao (2007) report that governments in poor localities in China tend to improve public services less than those in coastal areas.

Our results do not lend support to the Leviathan hypothesis. In our understanding, the effect of fiscal decentralization in curbing government expansion relies on some strict conditions, such as revenue autonomy granted to local authorities and limited central transfers or subsidies. Fiscal decentralization in developing countries may not fit squarely within these conditions. The Chinese situation neatly fits the collusion hypothesis because the central government has increased transfers to local governments markedly. Thus, expenditure

decentralization does not lead to hard budget constraints and tighter fiscal discipline in local China. In addition, we fail to find evidence to support the positive relationship between government size and minority factors, the gross dependency ratio, and the unemployment rate.

The most interesting findings in this study are that population per county and openness to trade and FDI reduce government size. To interpret scale effects, we would like to draw attention to dependent variables again. For many countries, personnel costs comprise the single largest item in governmental budgets. In China, this is more pronounced as personnel costs account for more than half of local government expenditures (Burns 2007; Fock and Wong 2008). Civil servants and teachers consume the majority of those costs. Scale effects suggest that the average cost of public services provided by civil servants and teachers is much cheaper in localities with larger populations per county. Notice that the implication of scale effects should not be exaggerated. When two or more county units are merged, the cost of public services and goods may decline. It may also compromise the quality of public services.

Our empirical results document that openness to trade may serve as a device to promote a lean local government. Government efficiency improves when the capacity of institutional learning and adaptation has been enhanced. Especially when economic development is a primary concern of local leaders in developing countries, openness and FDI presence may become an engine both for GDP growth and governance enhancement. Cole et al. (2009) argue that provinces with better governance tend to attract more FDI inflows. Consequently, local officials have strong incentives to promote trade and FDI since they can reap great political capital from both improved administrative performance and GDP growth.

6 Conclusion

This paper reviews the literature regarding government size and provides an empirical study using data from China. Our research contributes to the literature by offering a careful empirical study for the case of a transition economy. In addition, the policy implications drawn from our findings are applicable not only to transition economies like China, but are applicable to other developing countries.

The results of our study document the following findings. (1) Wagner's law does not hold true in China. Poor localities have larger governments. (2) The 'economies of scale' hypothesis holds true for China. (3) Openness to trade and FDI facilitate government downsizing and improve allocative efficiency in public services. (4) Fiscal decentralization in China does not curb bureaucratic expansion. Rather, the revenue sharing system increases local government size. (5) Factors such as minority population shares, the gross dependency ratio and the unemployment rate do not have significant effects on government size.

Our empirical findings for China's case may have some implications for other developing countries. Expanding administrative areas in a reasonable way may be helpful for reducing local government size since, when scale effects hold, the increase in population per county may reduce the per capita cost of public service provision. Openness to trade and FDI can serve as a governance-enhancing device. This finding echoes some qualitative studies in other developing countries. Nevertheless, a worrisome issue in these countries is that further opening up to the global market may provoke resistance from entrenched insiders. The goal of governance-enhancing may not be realized when the country suffers from political setbacks on the road to trade openness.

In addition, public consumption and employment may promote local economic growth but, at the same time, they may be exploited as free goods for enhancing public officials' personal interests. Bureaucratic expansion as a result of nepotism has been embedded in the Chinese political and economic environment for a long time (Zhong 2003). Tensions exist between

advancing the welfare of the total population based on job creation in the public sector and maximizing personal interests through rent creation and poor governance. Thus, further research may need to go beyond the standard determinants of government size to explore the contributions of bureaucrats and other public officials to the growth of the public sector.

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Appendix 1: Variable definitions

Variable	Definition
GSIZE	Government Size: ratio of provincial budgetary expenditure to local GDP.
RGDP_PC	Economic Development: real GDP per capita
SONE	Share of National Expenditure
SONR	Share of National Revenue
VER_IMB	Vertical Imbalance
CP	Population per Country: total population divided by number of counties in a province
MC_PERC	Minority County in Percentage: the share of autonomous counties (mainly ethnic minority population) within a province
GDR	Gross Dependency Ratio: the percentage of population aged 0-14, 65 and above in the total population
UNEP_URBAN	Registered Unemployment Rate in Urban Areas
IMPEXP_PC	Openness: the ratio of total amount of trade (import plus export) per capita
FDI_STOCK	Accumulated FDI Stock per Capita

Appendix 2: Summary statistics for variables

Variable		Mean	Std. Dev.	Min	Max	Observations
GSIZE	overall	14.33537	5.45327	5.676461	34.85395	N = 270
	between		5.071202	7.838151	29.25498	n = 30
	within		2.187667	5.037839	20.70225	T = 9
RGDP_PC	overall	7786.157	5616.638	2306.62	32140.28	N = 270
	between		5655.5	2507.439	28983.6	n = 30
	within		716.3513	4483.865	12127.72	T = 9
SONE	overall	2.335185	1.351105	0.4	7.6	N = 270
	between		1.354626	0.411111	6.888889	n = 30
	within		0.212244	1.690741	3.124074	T = 9
SONR	overall	1.569259	1.337388	0.1	7.1	N = 270
	between		1.340167	0.1	6.255556	n = 30
	within		0.214413	0.691482	2.413704	T = 9
VER_IMB	overall	51.42556	15.35421	17.69	93	N = 270
	between		14.3761	23.26778	82.92	n = 30
	within		5.935145	28.53334	66.01111	T = 9
CP	overall	466600.3	181307.3	116976.7	955263.2	N = 270
	between		182460.9	122635.7	860649.1	n = 30
	within		23884.6	337951.2	574778.4	T = 9
MC_PERC	overall	24.18019	34.38601	0	100	N = 270
	between		34.74189	0	97.45333	n = 30
	within		3.360692	1.492409	30.66241	T = 9
GDR	overall	41.24856	8.407216	21.96	60.44	N = 270
	between		5.801471	28.81111	49.73778	n = 30
	within		6.166456	21.61078	54.59522	T = 9
UNEP_URBAN	overall	3.556296	0.834178	0.6	6.5	N = 270
	between		0.644972	1.277778	4.888889	n = 30
	within		0.540587	1.634074	5.167407	T = 9
IMPEXP_PC	overall	6638.489	14410.09	122.18	99935.02	N = 270
	between		12557.9	209.1544	50156.86	n = 30
	within		7391.882	-25792.8	56416.65	T = 9
FDI_STOCK	overall	419.6916	629.7546	3.034643	3494.112	N = 270
	between		608.4694	13.4097	2363.085	n = 30
	within		193.3045	-399.608	1550.718	T = 9

References

Akitoby, B., Clements, B., Gupta, S., & Inchauste, G. (2006). Public spending, voracity, and Wagner's law in developing countries. *European Journal of Political Economy, 22*(4), 908–924.

Alesina, A., & Wacziarg, R. (1998). Openness, country size and government. *Journal of Public Economics, 69*(3), 305–321.

Andrews, R., & Boyne, G. A. (2009). Size, structure and administrative overheads: An empirical analysis of English local authorities. *Urban Studies, 46*(4), 739–759.

Brennan, G., & Buchanan, J. M. (1980). *The power to tax: Analytical foundations of a fiscal constitution*. Cambridge: Cambridge University Press.

Brødsgaard, K. E. (2002). Institutional reform and the *bianzhi* system in China. *The China Quarterly, 170*, 361–386.

Burns, J. P. (2007). Civil service reform in China. *OECD Journal on Budgeting, 7*(1), 57–81.

Burns, J. P. (2003). "Downsizing" the Chinese state: Government retrenchment in the 1990s. *The China Quarterly, 175*, 775–802.

Burns, J. P. (2001). Public sector reform and the state: The case of China. *Public Administration Quarterly, 24*(4), 419–436.

Chen, C. (2004). Fiscal decentralization, collusion and government size in China's transitional economy. *Applied Economics Letters, 11*(11), 699–705.

Cole, M. A., Elliott, R. J. R., & Zhang, J. (2009). Corruption, governance and FDI location in China: A province-level analysis. *Journal of Development Studies, 45*(9), 1494–1512.

Congleton, R. D. (2001). The politics of government growth. In L. Razzolini, & W. F. Shughart (Eds.), *The Elgar companion to public choice* (pp. 457–478). Cheltenham, UK; Northampton, MA: Edward Elgar Pub.

Cooke, F. L. (2003). Seven reforms in five decades: Civil service reform and its human resource implications in China. *Journal of the Asia Pacific Economy, 8*(3), 380–404.

Cusack, T. R., Notermans, T., & Rein, M. (1989). Political-economic aspects of public employment. *European Journal of Political Research, 17*(4), 471500.

Deng, X. (1984). *Selected works of Deng Xiaoping, 1975–1982*. Beijing: Foreign Languages Press.

De Witte, K., & Moesen, W. (2010). Sizing the government. *Public Choice, 145*, 39–55.

Ehdaie, J. (1994). *Fiscal decentralization and the size of government*. Washington, DC: The World Bank.

Esping-Andersen, G. (1996). *Welfare states in transition: National adaptations in global economies*. London; Thousand Oaks, Calif.: Sage.

Ferris, J. S., Park, S. P., & Winer, S. L. (2008). Studying the role of political competition in the evolution of government size over long horizons. *Public Choice, 137*, 369–401.

Fock, A., & Wong, C. P. W. (2008). *Financing rural development for a harmonious society in China* (Policy Research Working Paper No. wps 4693). Washington, D.C.: The World Bank.

Gelb, A., Knight, J. B., & Sabot, R. H. (1991). Public sector employment, rent seeking and economic growth. *The Economic Journal, 101*, 1186–1199.

Grossman, P. J. (1989). Fiscal decentralization and government size: An extension. *Public Choice, 62*(1), 63–69.

Halicioglu, F. (2003). Testing Wagner's law for Turkey, 1960–2000. *Review of Middle East Economics and Finance, 1*(2), 129–140.

Hood, C. (1995). The "new public management" in the 1980s: Variations on a theme. *Accounting, Organizations and Society, 20* (2/3), 93–109.

Hsiao, C. (2002). *Analysis of Panel Data* (2nd edn). New York: Cambridge University Press.

Hsiao, C., & Tahmiscioglu, A.K. (2008). Estimation of Dynamic Panel Data Models with Both Individual and Time Specific Effects. *Journal of Statistical Planning and Inference, 138*(9), 2698–2721.

Iyare, S.O., & Lorde, T. (2004). Co-integration, causality and Wagner's law: tests for selected Caribbean countries. *Applied Economics Letters, 11*, 815–825.

Ji, X., Liang, X., & Wang, R. (2004). The assessment of county-level fiscal performances and the policy recommendations. *Fujian Tribune (Humanities & Social Sciences Monthly, Fujian luntan), 4*, 109–112.

Jin, J., & Zou, H. (2002). How does fiscal decentralization affect aggregate, national, and subnational government size? *Journal of Urban Economics, 52*(2), 270–293.

Kimakova, A. (2009). Government size and openness revisited: The case of financial globalization. *Kyklos, 62*(3), 394–406.

Lalvani, M. (2002). Can decentralization limit government growth? A test of the Leviathan hypothesis for the Indian Federation. *Publius: The Journal of Federalism, 32*(3), 25–45.

Lin, S., & Song, S. (2002). Urban economic growth in China: Theory and evidence. *Urban Studies, 39*(12), 2251–2266.

Liu, M. & Tao, R. (2007). Local governance, policy mandates and fiscal reform in China. In V. Shue, & Wong C (Eds.), *Paying for progress in China: public finance, human welfare and changing patterns of inequality* (pp. 166–189). London; New York: Routledge.

Malesky, E. J. (2004). Push, pull, and reinforcing: The channels of FDI influence on provincial governance in Vietnam. In B. J. Kerkvliet, & D. G. Marr (Eds.), *Beyond Hanoi: Local government in Vietnam* (pp. 285–333). Copenhagen: Nias.

Marlow, M. L. (1988). Fiscal decentralization and government size. *Public Choice, 56*(3), 259–269.

Martin, J. P. (1982). Public sector employment trends in Western industrialized economies. In R.H. Haveman (Eds.), *Public finance and public employment*, Detroit: Wayne State University Press, 1982.

Martinez-Vazquez, J., & Yao, M. (2009). Fiscal decentralization and public sector employment: A cross-country analysis. *Public Finance Review, 37*(5), 539–571.

Ministry of Finance. 1999-2007. *Finance Yearbook of China*. Beijing: China Public Finance Economics Press.

Ministry of Finance. 1999-2009. *Local Fiscal Statistical Materials*. Beijing: China Public Finance Economics Press.

Mueller, D. C. (2003). *Public choice III.* Cambridge; New York: Cambridge University Press.

National Bureau of Statistics. 1999-2008. *China Statistical Yearbook*. Beijing: China Statistics Press

Ngok, K., & Zhu, G. (2007). Marketization, globalization and administrative reform in China: A zigzag road to a promising future. *International Review of Administrative Sciences, 73*(2), 217–233.

Ni, H., & An, X. (2008). Government size and administrative cost: a perspective of fiscal management. *Chinese Public Administration, 1*, 17–20.

Oates, W. E. (1985). Searching for leviathan: An empirical study. *American Economic Review, 75*(4), 748–757.

Ram, R. (2009). Openness, country size, and government size: Additional evidence from a large cross-country panel. *Journal of Public Economics, 93*(1-2), 213–218.

Ram, R. (1987). Wagner's hypothesis in time-series and cross-section perspectives: Evidence from "real" data for 115 countries. *The Review of Economics and Statistics, 69* (2), 194–204.

Research Institute for Fiscal Science of the Ministry of Finance. (2002). Analysis on pay arrears at the county and township level. *Chinese Fiscal Research (Caizheng Yanjiu), 4*, 36–41.

Rodden, J. (2002). The dilemma of fiscal federalism: Grants and fiscal performance around the world. *American Journal of Political Science, 46*(3), 670–687.

Rodrik, D. (1998). Why do more open economies have bigger governments? *Journal of Political Economy, 106* (5), 997–1032.

Sinha, D. (2007). *Does the Wagner's law hold for Thailand? A time series study*. http://mpra.ub.uni-muenchen.de/2560/1/MPRA_paper_2560.pdf. Accessed 1 July 2009.

Stein, E. (1998). Fiscal decentralization and government size in Latin America. In K. Fukasaku & R. Hausmann (Eds.), *Democracy, Decentralization and Deficits in Latin America*, Paris: IDB-OECD, 1998.

Tobin, D. (2005). Economic liberalization, the changing role of the state and "Wagner's law": China's development experience since 1978. *World Development, 33*(5), 729–743.

Wagner, A. (1893). *Grundlegung der Politischen Oekonomie*. Leipzig: C.F. Wintersche Verlagshandlung.

Wang, S. (2002). The political logic of the fiscal transfer system in China, *Strategy and Management (zhanlve yu guanli), 3*, 47–54.

Yang, D. L. (2004). *Remaking the Chinese Leviathan: Market transition and the politics of governance in China*. Stanford, Calif.: Stanford University Press.

Zhang, G. (2007). The determinants of the Chinese public administrative cost. *Journal of Tianjin Administration Institute (Tianjin xingzheng xueyuan xuebao), 9*(2), 16-20.

Zhang, G. (2008a). The determinants of provincial variants of civil service size, *Journal of Public Administration (gonggong xingzheng pinglun), 1*, 89–111.

Zhang, G. (2008b). Fiscal size, establishment reform and civil service size: An empirical study based on the panel data for the period 1978–2006, *CASS Journal of Political Science (zhengzhixue yanjiu), 4*, 97–107.

Zhong, Y. (2003). *Local government and politics in China: Challenges from below*. Armonk, N.Y.: M.E. Sharpe.

Zhu, Z., & Krug, B. (2005). *Is China a Leviathan?* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=636813. Accessed 8 May 2009.

Ziramba, E. (2008). Wagner's law: An econometric test for South Africa, 1960–2006. *South African Journal of Economics*, *76*(4), 596-606.

Table 1 Fixed-effect and random-effect models with trade factor

Dependent Variable: Government Size — Sample Period: 1998-2006 (30 provinces)

	FE	FE	FE	RE	RE	RE
Economic Development	-0.745***	-0.402***	-0.376***	-0.585***	-0.420***	-0.454***
	(0.098)	(0.116)	(0.105)	(0.086)	(0.091)	(0.083)
Scale Effects	0.046	-0.084	0.021	-0.249*	-0.113	-0.121
	(0.147)	(0.169)	(0.174)	(0.100)	(0.096)	(0.092)
Minority Density	0.006***	0.008***	0.007***	0.007***	0.005***	0.006***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Gross Dependency Ratio	0.057	0.144***	0.147***	0.089*	0.123**	0.124**
	(0.033)	(0.037)	(0.037)	(0.036)	(0.038)	(0.038)
Urban Unemployment Rate	0.204***	0.144***	0.140***	0.182***	0.141***	0.153***
	(0.036)	(0.042)	(0.041)	(0.038)	(0.040)	(0.040)
Trade	0.183***	0.216***	0.211***	0.206***	0.209***	0.213***
	(0.016)	(0.019)	(0.018)	(0.017)	(0.019)	(0.018)
Revenue Decentralization	0.669***	-	-	0.291***	-	-
	(0.075)			(0.059)		
Expenditure Decentralization	-	-0.007	-	-	-0.084*	-
		(0.049)			(0.040)	
Vertical Imbalance	-	-	0.095*	-	-	- 0.126**
			(0.043)			(0.043)
Constant	6.153**	4.743*	2.818	8.541***	5.473***	5.320***
	(1.953)	(2.271)	(2.401)	(1.405)	(1.402)	(1.342)
Hausman Test	-	-	-	102.83***	12.64*	7.87
R-Squared	0.699***	0.597***	0.606***	-	-	-
N	270	270	270	270	270	270

1). * p < 0.05, ** p < 0.01, *** p < 0.001.
2). Asymptotic standard errors, asymptotically robust to heteroskedasticity, are reported in parentheses.
3). All variables, except *Minority Density*, are in logarithms.

Table 2 Fixed-effect and random-effect models with FDI factor

Dependent Variable: Government Size — Sample Period: 1998-2006 (30 provinces)

	FE	FE	FE	RE	RE	RE
Economic Development	-0.428***	0.009	-0.026	-0.273**	-0.064	-0.120
	(0.099)	(0.106)	(0.100)	(0.085)	(0.086)	(0.084)
Scale Effects	0.119	-0.030	0.098	-0.361***	-0.157	-0.203
	(0.162)	(0.182)	(0.188)	(0.110)	(0.106)	(0.108)
Minority Density	0.006***	0.007***	0.006**	0.009***	0.007***	0.008***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Gross Dependency Ratio	0.008	0.091*	0.094*	0.025	0.061	0.061
	(0.036)	(0.039)	(0.039)	(0.041)	(0.043)	(0.042)
Urban Unemployment Rate	0.250***	0.165***	0.179***	0.282***	0.236***	0.265***
	(0.040)	(0.046)	(0.044)	(0.041)	(0.044)	(0.043)
FDI	0.188***	0.233***	0.232***	0.187***	0.171***	0.182***
	(0.024)	(0.026)	(0.026)	(0.025)	(0.026)	(0.026)
Revenue Decentralization	0.685***	-	-	0.278***	-	-
	(0.084)			(0.063)		
Expenditure Decentralization	-	-0.087	-	-	-0.153***	-
		(0.051)			(0.043)	
Vertical Imbalance	-	-	0.102*	-	-	0.132**
			(0.047)			(0.049)
Constant	2.949	1.064	-0.699	7.929***	3.692*	4.136**
	(2.105)	(2.366)	(2.532)	(1.566)	(1.554)	(1.586)
Hausman Test	-	-	-	81.71***	281.67*	163.75***
R-squared	0.699***	0.597***	0.606***	-	-	-
N	270	270	270	270	270	270

1). * p < 0.05, ** p < 0.01, *** p < 0.001.
2). Asymptotic standard errors, asymptotically robust to heteroskedasticity, are reported in parentheses.
3). All variables, except *Minority Density*, are in logarithm.

Table 3 GMM model

Dependent Variable: Government Size — Sample Period: 1998-2006 (30 provinces)

	GMM	GMM	GMM	GMM	GMM	GMM
Economic Development	-0.181**	-0.001	0.064	-0.203***	-0.063	0.050
	(0.054)	(0.088)	(0.086)	(0.057)	(0.085)	(0.083)
Scale Effects	-0.252***	-0.412**	-0.356**	-0.237**	-0.534***	-0.442**
	(0.074)	(0.134)	(0.133)	(0.077)	(0.140)	(0.135)
Minority Density	-0.005	0.026	0.031	0.000	0.019	0.035
	(0.004)	(0.074)	(0.067)	(0.004)	(0.077)	(0.068)
Gross Dependency Ratio	0.097**	0.003	-0.009	0.093**	0.010	0.008
	(0.030)	(0.046)	(0.047)	(0.030)	(0.039)	(0.042)
Urban Unemployment Rate	0.106**	0.025	0.030	0.092*	0.025	0.053
	(0.032)	(0.044)	(0.042)	(0.036)	(0.039)	(0.041)
Trade	-0.060**	-0.064*	-0.043	-	-	-
	(0.018)	(0.027)	(0.025)			
Revenue Decentralization	0.746***	-	-	0.752***	-	-
	(0.043)			(0.042)		
Expenditure Decentralization	-	0.212***	-	-	0.231***	-
		(0.033)			(0.033)	
Vertical Imbalance	-	-	-0.042	-	-	-0.071
			(0.043)			(0.042)
FDI	-	-	-	-0.100**	-0.141***	-0.076*
				(0.035)	(0.040)	(0.037)
Hansen Statistic	23.340	28.894	30.763	19.353	28.937	29.123
P-Value	0.716	0.418	0.328	0.887	0.416	0.406
Number of IVs	28	28	28	28	28	28
N	120	120	120	120	120	120

1). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

2). The GMM estimates reported are all two-step results.

3). Asymptotic standard errors, asymptotically robust to heteroskedasticity, are reported in parentheses.

4). All variables, except *Minority Density*, are in logarithm.

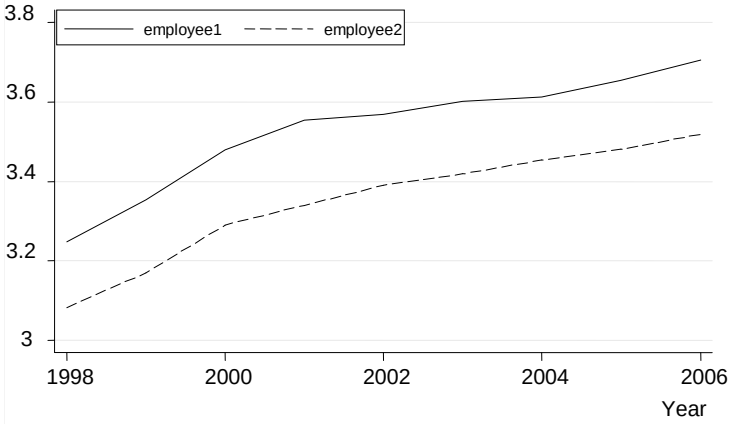

Fig. 1 Public employee as percentage of total population in China (1998-2006, unit: %)

Data source: *Local Fiscal Statistical Materials*, 1999–2009.

Note: (1) Employee1 refers to public sector employees (may not be publicly funded) in local governments while employee2 refers to budgeted employees paid by local governments. (2) The data is collected from Local Fiscal Statistical Materials and is normally lag two years behind the publishing year after 2003. For example, the data for 2005 were released in 2007.

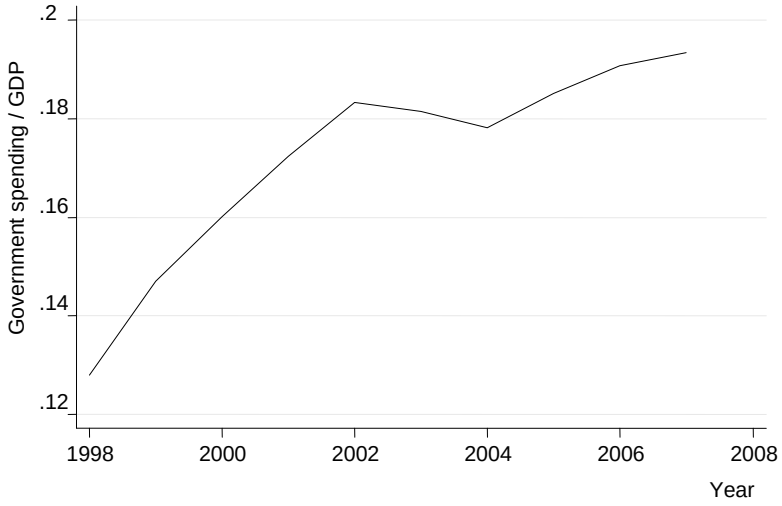

Fig. 2 Government spending as percentage of GDP in China

Data source: *China Statistical Yearbook*, 2008.